

Notice of Allowability

Application No.

10/604,223

Examiner

Raquel Y. Gordon

Applicant(s)

HUANG ET AL.

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to this application filed 7/1/2003.
2. ☒ The allowed claim(s) is/are 1-17.
3. ☒ The drawings filed on 01 July 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 7/1/03&2/11/04
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Raquel Y. Gordon
Primary Examiner
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Reasons for Allowance

The following is an examiner's statement of reasons for allowance. The primary reasons for allowance is the following claim combinations are not taught by the prior art. The novel and non-obvious features are emphasized with bolding and underlining below:

1. A fluid injection head structure comprising: a substrate; **a manifold formed in the substrate**; at least two rows of chambers in flow communication with the manifold and positioned on two sides of the manifold, wherein fluid flows into the chambers through the manifold; a plurality of orifices in flow communication with a corresponding chambers; a plurality of bubble generators disposed on the substrate, **only single bubble generator being disposed in one chamber**, and each bubble generator being disposed approximately adjacent to a corresponding orifice and external to the corresponding chamber; a driving circuit comprising a plurality of functional devices disposed on the substrate for sending driving signals to drive the plurality of the bubble generators; and **a conductive trace disposed on the substrate for driving the bubble generators, wherein a portion of the conductive trace is disposed above the manifold and between the two rows of chambers.**

2. The fluid injection head structure of claim 1 wherein each bubble generator is disposed above the corresponding chamber.

3. The fluid injection head structure of claim 1 wherein the single bubble generator in

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the chamber is disposed between the manifold and the corresponding orifice.

4. An apparatus for ejecting fluid, comprising: a chamber; a manifold in flow communication with the chamber for supplying fluid to the chamber; an orifice in flow communication with the chamber; a means for generating a first bubble within the chamber when the chamber is filled with liquid, the first bubble generating means disposed approximately adjacent to the orifice and external to the chamber; and a means for generating a second bubble within the chamber when the chamber is filled with liquid, the second bubble generating means disposed approximately adjacent to the orifice and external to the chamber, **wherein the orifice is disposed between the first bubble generating means and the second bubble generating means, wherein the first bubble and the second bubble are generated at substantially the same time, and the formation of the first bubble and the second bubble causes fluid in the chamber to eject through the orifice substantially perpendicular to the chamber.**

5. The apparatus of claim 4 wherein the first bubble generating means and the second bubble generating means are first and second resistors, respectively.

6. The apparatus of claim 5 wherein the first and second resistors have approximately equal resistance values.

7. The apparatus of claim 5 wherein the first and second resistors are disposed above the chamber.

8. A printhead for ejecting ink, comprising: a substrate; a manifold formed in the substrate; a plurality of chambers in flow communication with the manifold, wherein ink flows through the manifold into the chambers; a plurality of orifices in flow communication with a corresponding chamber; a means for generating a first bubble and a second bubble within the corresponding chamber when the corresponding chamber is filled with liquid, the first bubble generating means and the second bubble generating means disposed approximately adjacent to a corresponding orifice and external to the corresponding chamber; wherein the orifice is disposed between the first bubble generating means and the second bubble generating means; and an addressing circuit means including a plurality of pads and demultiplexing means, the addressing circuit means being disposed on the substrate and connected between the first bubble generating means, the second bubble generating means, and the pads, wherein the number of pads is less than the number of chambers.

9. The printhead of claim 8 wherein the first bubble and the second bubble are generated at substantially the same time, and the formation of the first bubble and the second bubble causes fluid in the chamber to eject through the orifice substantially perpendicular to the chamber.

10. The printhead of claim 9 wherein the first bubble generating means and the second bubble generating means are first and second resistors, respectively.

11. The printhead of claim 10 wherein the first and second resistors have approximately equal resistance values.

12. The printhead of claim 10 wherein the first and second resistors are disposed above the chamber.

13. A printing system having a printhead for ejecting ink, comprising: a supply of ink in an ink reservoir; a substrate of the printhead; a manifold formed in the substrate; a plurality of chambers in flow communication with the manifold, wherein ink flows through the manifold into the chambers, **the chambers being spaced apart from each other a predetermined distance so as to provide printing equal to or greater than approximately 300 dots per inch in a single pass of the printhead across a medium**; a means for generating a first bubble and a second bubble within a corresponding chamber when the corresponding chamber is filled with liquid, the first bubble generating means and the second bubble generating means disposed approximately adjacent to a corresponding orifice and external to the corresponding chamber; wherein the orifice is disposed between the first bubble generating means and the second bubble generating means; **and a first circuitry including a plurality of pads and demultiplexing means, the first circuitry being disposed on the**

substrate and connected between the first bubble generating means, the second bubble generating means, and the pads, wherein a total number of the pads is less than or equal to approximately one-twelfth of a total number of the first bubble and second bubble generating means on the substrate.

14. The printing system of claim 13 wherein the first bubble and the second bubble are generated at substantially the same time, and the formation of the first bubble and the second bubble causes fluid in the chamber to eject through the orifice substantially perpendicular to the chamber.

15. The printing system of claim 14 wherein the first bubble generating means and the second bubble generating means are first and second resistors, respectively.

16. The printing system of claim 15 wherein the first and second resistors have approximately equal resistance values.

17. The printing system of claim 15 wherein the first and second resistors are disposed above the chamber.

While Chen et al. (US 20020097301A1) teach a substrate (38), a manifold (16), orifice (18), bubble generators 20 and 22, and drive circuitry (¶0025), Chen et al. does not teach the claimed combinations as emphasized above.

Further, while Jerman (US005824204A) teaches pads, Jerman does not teach the number of pads is less than the number of chambers, as claimed in claim 8.

The independent claims are thus allowed. Further, the dependent claims are allowed since they depend from allowed base claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In the Claims:

In claim 4, on line 9, changed "the" (second occurrence) to --a--.

This change was made to give proper antecedent basis to the claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Raquel Y. Gordon, whose telephone number is (571) 272-2145. The Examiner can normally be reached on M Tu Th and F 8:30-6:00.

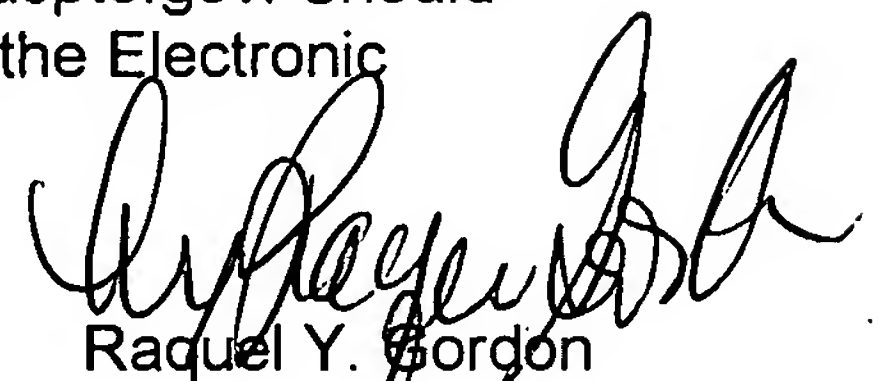
If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. A fax number is available upon request.

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Any inquiry of a general nature or relating to the status of this application or proceeding may be directed to the Examiner or Supervisor.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Raquel Y. Gordon

Primary Examiner

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December 12, 2004

RAQUEL GORDON
PRIMARY EXAMINER